2 Sheets--Sheet 1.

M. DYER.

Apparatus for Navigating the Air.

No. 154,654. Patented Sept. 1, 1874.

Fig 1.

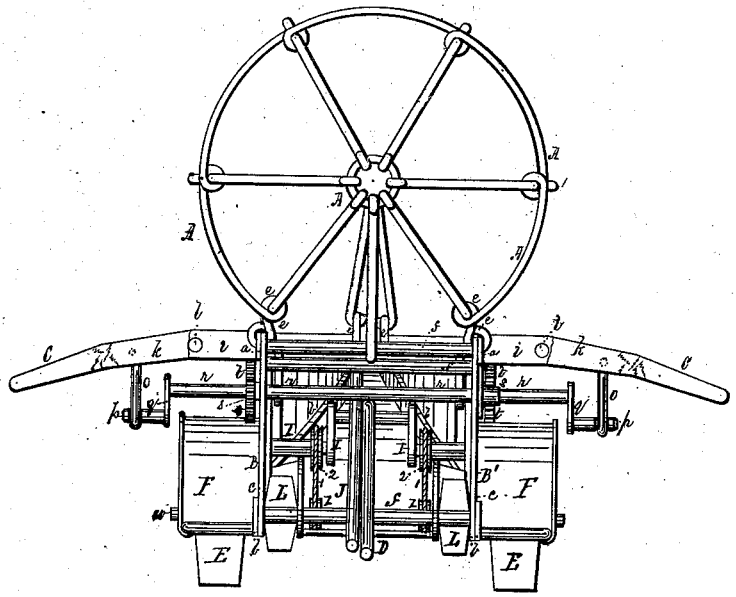
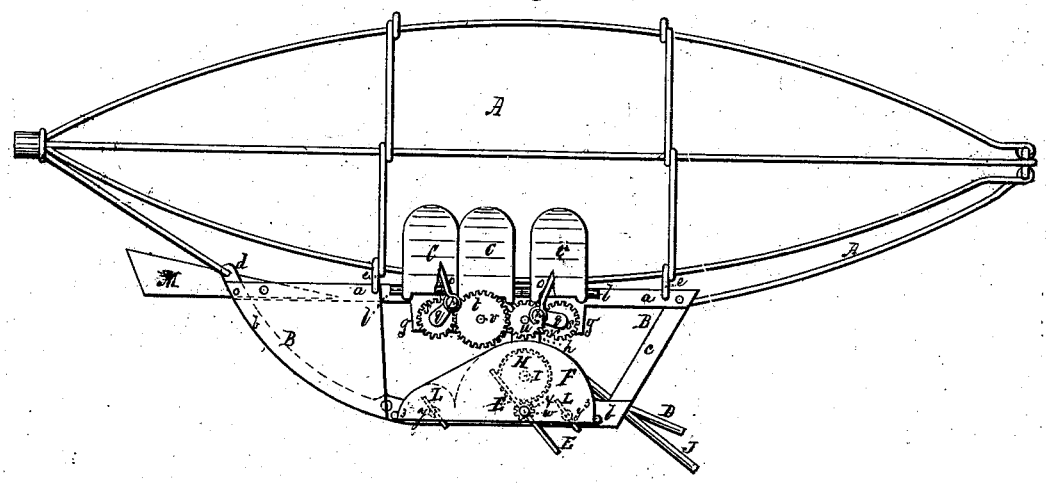


Fig 2.



WITNESSES.

D. G. Stuart

Leslie Pinckney

INVENTOR

Micajah Dyer

per S. Hanway Attorney

2 Sheets--Sheet 2.

M. DYER.

Apparatus for Navigating the Air.

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Fig. 3.

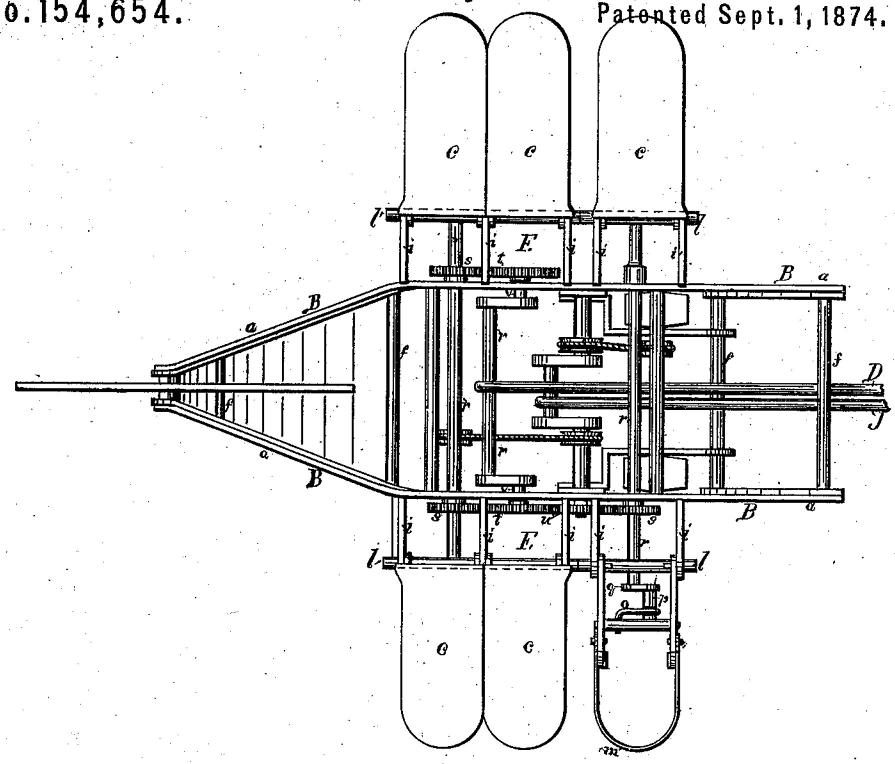
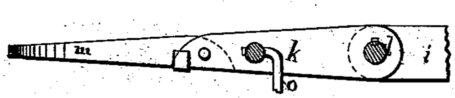


Fig. 4.



Witnesses.
D. G. Stuart
Leo Van Riswick

Inventor.
Micajah Dyer
per P. Hannay Atty.

UNITED STATES PATENT OFFICE.

MICAJAH DYER, OF BLAIRSVILLE, GEORGIA.

IMPROVEMENT IN APPARATUS FOR NAVIGATING THE AIR.

Specification forming part of Letters Patent No. **154,654**, dated September 1, 1874; application filed June 10, 1874.

To all whom it may concern:

Be it known that I, MICAJAH DYER, of Blairsville, in the county of Union and State of Georgia, have invented certain new and useful Improvements in Apparatus for Navigating the Air; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 represents a front view of a machine embodying my improvements; and Fig. 2, a side elevation of the same, the covering of the balloon portion of the apparatus in both views being omitted. Fig. 3 represents a plan of the frame detached from the balloon.

The object of my invention is to facilitate the navigation of the air; and its nature consists in a new and improved mode of constructing what may be termed a "flying ship," to be propelled by steam or other suitable motive power.

In the drawing, the apparatus is represented as consisting of a large balloon, A, connected, in any known and suitable manner, with a strong but light frame, B B′, for the support and attachment of the propelling mechanism.

The frame B B′ may be made of any suitable shape; but I prefer to make it of the form shown in Fig. 2—that is to say, of two side frames, each consisting of two side beams or rails, *a* and *b*, connected together at their rear end in a vertical direction by a brace or truss, *c*, and at their forward end by bending the lower rail, *b*, upward and forward, so as to cross the line of the upper, as shown in dotted lines in Fig. 2, the two being then firmly bolted to each other at that point. In addition to this the two rails thus joined together are bent or inclined inward, so that, when the two sides B B′ thus made are joined together, they will present a wedge-shaped appearance from the front, as illustrated in Fig. 3. The forward ends, *d*, of the lower rails, *b*, are made to project a little above the edge of the upper rails, and are provided with an opening for attachment to the balloon-frame A, corresponding holes for a like purpose being made in the upper rails along the line of their length. This attachment may be made in any suitable way, as, for instance, by links or link-rods *e*.

The balloon-frame A may be made of any suitable material which combines lightness with strength, and in any known or suitable manner, and of any known and approved form; and it is intended to be covered with some light, but strong, air and water proof material, such as experience and the necessities of the case may dictate.

The two sides B B′ of the frame may be secured together in any suitable manner—as, for instance, by stay-rods *f*, arranged above and below at proper intervals apart, in order to give the necessary strength and rigidity to the frame, care being taken not to use more than is absolutely necessary for the purpose, or to make them, or any other part, so large as to unnecessarily increase the weight of the apparatus beyond what is absolutely necessary for strength and rigidity.

The upper rails, *a*, are provided with plates *g* and with standards *h*, in which are formed bearings for the shafts of the propelling mechanism, and which I will now describe, here premising that the apparatus is intended to be propelled by different kinds of devices—to wit, wings and paddle-wheels, both to be simultaneously operated through the instrumentality of mechanism connected with the driving power.

To the outside of each upper rail, *a*, of the frame are rigidly secured a series of projecting lugs, *i*, for the support and attachment of the wings, in number varying according to the number of wings to be used. In this case the apparatus is represented as having three wings on each side; but a less or greater number may be used, according to the judgment of the builder.

The wings C are formed by taking two arms, *k k*, of equal length, and keying them fast to a rock-shaft, *l*, mounted in bearings formed in the end of the lugs *i i*, and pivoting thereto the ends of a light beam, *m*, bent in the manner shown in Fig. 3; or the beam *m* may be

made in two halves, which may be riveted at their outer ends, if desired. The outer ends of the arms *k k* are connected by a stay-rod, *n*, to which one end of a connecting-rod, *o*, is pivoted, the other end of which is loosely mounted on the wrist-pin *p* of a crank-lever, *q*, and through which an up-and-down motion is imparted to the wing. This crank is mounted on one end of a shaft, *r*, on the other end of which is a similar crank, *q*, attached in the same way to a corresponding wing, C, on the other side of the frame, and which has its bearings in the plates *g*, formed on or otherwise secured to the under side of the upper rails, *a*, of the frame.

The two other wings C of each side are formed, mounted, and connected in the same way, with this difference, that both are driven from the same shaft *r'* and crank *q*, both being secured to the same rock-shaft *l*, and which has its bearings in the three remaining lugs *i* of each side.

Motion is imparted to each of the shafts *r* and *r'* through gears *s* at each end keyed fast thereto, and which in the one case gears directly with the main gears *t*, and in the other through the interposition of intermediate gears *u*, suitably mounted and arranged near each end of the shafts *r* and *r'*, and mounted on an axis secured to the outside of the plates *g*, which support the bearings of the shafts.

The main gears *t*, that drive the wings through the pinions above referred to, are mounted one on each side of the frame, respectively, upon the ends of a crank-shaft, *v*, and which also has its bearings in the plates *g*.

Motion is imparted to the crank-shaft *v* through a pitman-rod, D, which connects its crank with the prime motor in the ordinary way.

The wings thus constructed receive an up-and-down motion in the manner of the wings of a bird, their outer ends yielding as they are raised, but opening out and then remaining rigid while being depressed, this being effected by the action of clasp-stops secured to the under side of the bent beams *m*, which abut against the under side of the arms *k*. The wings C, if desired, may be set at an angle, so as to propel forward, as well as to raise the machine in the air, and which latter purpose is intended to be their principal function, and in which they are aided by the peculiar shape of the forward end of the apparatus, which, as will be seen by reference to the drawings, is inclined, so as to impart an upward tendency to the machine as it is propelled forward by the apparatus now about to be described.

The movement of the wings, as connected to the devices for operating them, will be obvious, as, motion being imparted to the pitman-rod D and crank-shaft *r*, the main driving-gears *t* will cause the gears *s* to turn, and with them their shafts *r r'* and cranks *q*, and thus cause the latter, through the connecting-rods *o o*, to impart the requisite up-and-down motion to the wings, in order to cause the latter to aid as well in raising and supporting the apparatus in the air as to propel it in its course to its final destination. Instead of moving all the wings of a side simultaneously, they may be alternately moved up and down, if desired.

Three sets of paddle-wheels are represented in the drawing as being applied to the propulsion of the apparatus.

The main set or pair of paddle-wheels E are each mounted in a suitable box or casing on a shaft, *w*, turning in bearings arranged in the casings F F, and in the lower rails *b* of their respective sides of the frame. Each of these shafts carries a pinion, *x*, which meshes with one of two gear-wheels, H, mounted on a crank-shaft, I, which, through a pitman-rod, J, derives motion from the prime motor used. These gear-wheels H are arranged one at each end of the crank-shaft I, being one for each pinion *x* and paddle-wheel.

A similar pair of paddle-wheels, L, is arranged immediately in front of the paddle-wheels E, but only smaller than the latter, and another pair in the rear. Each pair is mounted on a shaft, *y*, on each of which is secured a pulley, *z*, through which motion is imparted to the paddle-wheels through a belt, 1, which passes around pulley *z*, and a corresponding pulley, 2, secured to the crank-shaft I, there being one of said pulleys 2 for each pair of paddle-wheels L. Each of these paddle-wheels has an independent casing, 3, like that of the main paddle-wheels.

The operation of the paddle-wheels through the mechanism described is obvious, and, therefore, unnecessary to be further detailed.

The sides and bottom of the apparatus are intended to be inclosed with any suitable material, and in any suitable manner.

The apparatus is intended to be provided with suitable accommodations in front and rear for its passengers and managers, but to which it is unnecessary to allude, as such in this application is a secondary consideration.

The rudder M, for guiding the course of the apparatus, is represented as being mounted or pivoted at the forward end of the apparatus; but it may be appended at its rear, if desired; or both may be adopted for use simultaneously.

With such an apparatus, suitably proportioned and constructed, it is believed that the navigation of the air may be successfully accomplished.

Having thus described my invention, what is claimed as new is—

1. The combination of the balloon A with a frame, B B', carrying one or more pairs of rotating paddle-wheels, and one or more pairs of jointed wings, C, the whole being constructed, arranged, and operated in the manner and for the purposes set forth.

2. In combination with the body or frame

B B′ of a flying apparatus, having an inclined prow, the jointed wings C and one or more pairs of rotating paddle-wheels, the whole being constructed, arranged, and operated in the manner and for the purposes substantially as set forth.

3. The combination of the jointed wings C with the shafts *r r′*, cranks *q*, and connecting-rods *o*, as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of February, 1874.

MICAJAH DYER.

Witnesses:
FRANCIS M. SWAIN,
M. C. DYER, JR.